

# INNOVATION AND THE ROLE OF UNIVERSITIES IN COMMERCIALIZING RESEARCH RESULTS

*A Radio Broadcast with Professor Paul A. David<sup>†</sup>*

## I. INTRODUCTION

This piece contains the transcript of a WILL-AM Focus 580 radio broadcast with speaker Professor Paul David that occurred at the University of Illinois at Urbana-Champaign on October 30, 2006.<sup>1</sup> Topics included the role of universities in pursuing both fundamental and applied knowledge, problems that universities encounter when they attempt to commercialize their research, and the observed lack of profitability arising from such attempts at commercialization. The following comments have been lightly footnoted to provide background sources and edited for grammar. Professor David and Focus 580 host David Inge were given the opportunity to edit their own comments, and this transcript is published with the generous permission of both speakers.

## II. TRANSCRIPT

DAVID INGE: Good morning and welcome to our [morning talk program] of Focus 580. . . . Universities have always been places where ideas are created. However, today there are a lot of people who argue that universities should also be places where wealth is created for the benefit of their region—perhaps for the benefit of the entire country. And one big question that we'll try and talk about here is: should we be encouraging universities to patent and license the results of their research? Is that good for the university? Is it good for research? Is it good for the economy? These are just some of the very large and basic questions we'll discuss in this part of the program.

Our guest is Paul David. He's Emeritus Professor of Economics at

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1. The unedited audio of this transcript is available at <http://www.will.uiuc.edu/media/focus061030a.mp3> (last visited February 27, 2007).

Stanford University, where he's also Senior Fellow at the Institute for Economic Policy Research. He is, in addition, an Emeritus Professor of Economics and Economic History at the University of Oxford, and also Emeritus Fellow of All Souls College. Among the things he's interested in are the economics of science and technology. He served as consultant to a number of international organizations including the World Bank, the U.N. Commission on Trade and Development, and several directorates of the European commission of the E.U. Also, he's been a consultant to U.S. government agencies and foundations, including, just to name a few, the National Academy of Science, the National Science Foundation, and the Departments of Commerce and Energy.

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As we talk, the conversation is open to people who would like to join us. We just ask that people try and be brief, but anyone can call and talk . . . .

Thanks very much for being here.

PROFESSOR DAVID: Thank you, David. It's very good to be here.

MR. INGE: Maybe we might talk just a little bit about how it is that the idea of the university—what the university is supposed to be about—has changed over time. I guess particularly I'm interested in the point at which wealth generation starts to come in and is added to the ideas that universities are about teaching and universities are indeed about research. Those are pretty old ideas, that I guess go back some time. The idea of universities as engines of wealth creation is a little more recent. How does that come into the mix?

PROFESSOR DAVID: Questions about where things begin. There are many strands that have led to where we are today. But being here at Illinois, I would have to say that in the American experience—which differs from that of Europe, which invented what we would recognize as the university in the Middle Ages—from the very early stage, the land grant universities were oriented towards not only teaching the transmission of learning [and] culture, but they were interested in practical knowledge, applied knowledge in agriculture and agriculture technology, [and] in engineering. And from 1862 [with] the Morrill Act, which created a federal program that was based on an earlier program of public subsidies for public education in the Northwest Territories,<sup>2</sup> . . . the idea was that funds from the public would be used to support the creation of universities. The universities would teach people about things that would be important for the improvement of the country and for the improvement of enterprise, whether it was farming or whether it was bridge-building, road-building, construction, or mechanical engineering. So from a very early stage, the orientation of the state universities, as opposed to private universities, was geared both to these practical concerns with the wealth of the country, the wealth of the community, or the common weal as people talk about it, which was a practical one. It was not an ivory tower.

Of course, one would have to say that many peoples' idea of what the

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2. Morrill Act, 7 U.S.C. § 301 (2007).

European university was in the eleventh century—universities like Bologna, and soon after, Paris [and] Oxford—was that they were somehow a lofty separated thing from society. They weren't actually. They were organized to teach graduate students, advanced students who wanted to learn about Roman commercial law, which was coming back into use, [or] who wanted to learn about bookkeeping practices, and what was then cutting edge mathematics: algorithms for doing long division and multiplication. These were practical considerations. And those universities were very oriented to the world, and designed to teach people about rhetoric as a form of persuasion. In some sense, universities have always been in the world.

The question is whether the university was in the world through transmitting knowledge—through acquiring knowledge that would be of use and therefore should be transmitted—as distinct from being a player in the process of creating wealth. I think that the [latter idea] has been a more recent departure. Of course [as] an endorsement of public policy, wealth creation is a very recent departure, and came about at the beginning of the 1980s through the passage of a particular piece of legislation called the Bayh-Dole Bill,<sup>3</sup> which made it very easy for universities to own the intellectual property that was based on federally-funded research. That's how we got here in a nutshell.

MR. INGE: . . . Let me ask a much more basic question. Where do new ideas come from? Where will they come from? Where will they be developed? That can happen in the private sector: private business and industry can do it. Universities can do it. And I suppose there have always been individual entrepreneurs; there have been guys who are in their garage and basement, and who come up with new ideas and develop them. But if you look at private business as a generator of new ideas and the university as generator of new ideas, how do those two things compare? Particularly, has one or the other historically been more productive in terms of generating and developing new ideas?

PROFESSOR DAVID: I think the question really has to be considered in two parts. There are different kinds of ideas. There are ideas about fundamental properties of physical processes and ideas about the natural world. There are also ideas about the workings of societies and social systems. And then there are ideas about how to do things. So if we distinguish between statements of “what is” as distinct from statements of “what should be” in the sense of how we should do things, [we see] two different branches of knowledge. Those two branches of knowledge are reflected in language that we still use today. The word science comes from the Latin *scientia*, which means knowledge. We talk about technology today. That's actually from Greek *techni*, which is about useful arts. Those are the practical arts of how to do things. So the two kinds of knowledge are knowledge about understanding the processes in the world, which we sometimes refer to as fundamental knowledge, and applied knowledge. But I find what's basic and what's applied isn't a very clear distinction. There is knowledge that is oriented

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3. University and Small Business Patent Procedures (Bayh-Dole) Act, 35 U.S.C. §§ 200–212 (2004).

towards understanding how things work, and then there's knowledge about how to do new things, or how to make things work better.

Universities have been on both sides of the questions. The two questions occur naturally to people who ask about one kind of thing. For example, let's look at lasers. We start by asking what it is that produces or enables you to generate light using electricity. That is understanding the process. How can we make a laser glow and produce a coherent beam of light? And then there are further questions. What could we use that for? How could we make a laser that would be able to be used for surgery, or for doing lightshows, or to be used in a pencil as a pointer? So there's a spectrum of questions and the issue about where the sources or different ideas come from has to do in some way with what the stimuli for the ideas are. So in businesses where people are interacting with potential customers and users, one tends to work backward from the knowledge of what people could use something for and what they are willing to pay for it, and then to design things from that side. Of course in order to do that you have to understand what you could decide. Could you make a very small, low-powered laser to use in a pointer? You need to have knowledge. The knowledge base for that often comes from the questions about trying to find out what makes a laser work.

Both of these activities are pursued in a university context. And there are many parts of universities that can't really teach people how to use the skills of engineering without actually being in close contact with industries that have big engineering problems. And so the orientation of these parts of universities is more towards being able to work in that environment. There are other pursuits in universities, which can be more abstract, which can be more interested in not a particular use, but in generalization. So we want to talk not about nitrogen or oxygen, but we want to talk about gas laws in general. What are the things that cover the properties of all gases that would be the same? What is different between specific gases? And so the margin between those two types of questions is always shifting a little bit depending upon, in some sense, where it is easier or faster to make progress. However, the more fundamental questions are further away from commercial application, from commercial use, and so they tend to be pursued in scientific communities that are not oriented towards the issue of how one makes money.

MR. INGE: Well, there is a point where I hoped you were headed, and let me grab right onto that. We're leaping ahead a little bit, but—if this is not too much of an oversimplification—if we really say that private businesses, for-profit businesses are concerned with taking things, making something out of it that people can use, and making money, where does that leave universities? Universities may have some of that concern, but because they are generally non-profit institutions, making money is really not their focus. What if we say to universities: “Well, really more and more, it would be a good idea if profit was your focus.”? Does that change the nature of the university? Will it change decisions about what sort of research is pursued? Will it be less likely that the university will pursue knowledge and new discoveries essentially for the sake of them, and will it instead concentrate more resources on what it can

develop that it can then make money on?

PROFESSOR DAVID: I think such a policy will have the effect of altering the nature of what goes on in universities if in fact universities were able to pursue profit in a whole-hearted way. But I actually think [what] is more worrisome about this [policy] is that the structure of universities as organizations, the general ethos, the culture of academic life, and the people who are involved in teaching and transmitting knowledge to students, are all geared towards something else. There is a conflict between having to think about how we use this knowledge and how we might want to guard this knowledge until we're ready to be able to extract a profit from controlling it. [Profit] comes into conflict with other things that are part of the social mission, which is why universities are supported by the public, why they are non-profit organizations. And so I think that what you get is something like a hybrid if you demand that universities attempt to make profit. Some hybrids are good, and some hybrids are monsters. That is, they are really not viable creatures because you've crossed two things and really got two parts that don't work together. Most of them perish. Now, you can keep such hybrids alive, but the question is whether what you get if you do this cross of a university that is in the knowledge-for-profit business, is a bad business and a bad university. That's been my concern. I think that there are bits of evidence that point towards the view that, although there has been a lot of good evidence, not all of the experiences of having universities directed towards the goal of wealth creation by managing their knowledge resources have been positive. I think there have been a lot of unexpected and not-so-positive consequences as part of the picture.

MR. INGE: . . . We're talking here a little about what is involved when universities go aggressively into commercializing the results of their research and whether that is a good thing or a bad thing. Questions are welcome . . .

For a moment here, if you look back far enough into the history of science, you have a place where people who were doing science believed in secrecy. They kept what they were doing very closely held. Then we come to a point where the value changes and the idea is that secrecy is really not what should be occurring. In fact, there is a point where we decide that we can do better if perhaps we still have rivalries, but we share what we know. Is it your concern that, if universities become more aggressive when working on commercializing results of their research, and we talk about strong intellectual property issues, that we're in a sense going back to a time when scientists can't [or] won't share what they know? Will researchers again hold their findings close because they and their institutions are thinking about the potential of licensing, patenting, and making money? Those are important secrets for them to hold onto. It will work against the notion of open science.

PROFESSOR DAVID: You have it exactly right. I think that there are two ways that one can see this. One is if you think about how best to solve a complicated problem, such as a jigsaw puzzle. You come fairly quickly to the benefits of having a lot of people able to look at the puzzle on the table, to spot a piece that might fit into an area, and to be able to do it more or less in real

time, together, in an interactive way. In that way, everybody is looking at [the problem] through their own eyes, everybody has their idea of where that piece might fit in, but nonetheless they quickly share what they know with other people so they can build on what each other has done, on what each person has done. Each person puts in a piece, creates a new edge and somebody can spot where the next piece goes. That process goes faster when it is done in a cooperative, open fashion. In science, cooperation is more important than with a jigsaw puzzle because people, when they produce new findings, usually do so by building new tools, new techniques, and new ways to process data. When they share not only what they found, but also the method they used, then other people have access to the method, and they can check the accuracy of the method. This collective sharing process, from society's viewpoint, is a better way to use resources.

One problem with it is that if everybody gives away all the things that they know, they cannot support themselves by their knowledge in the sense of being able to sell it. You can't both give it away and ask for money for it once you have given it away. People say, "Well, everybody knows that now." So that kind of science needs to be supported, in the modern world, in general, by public sources or by the patronage of private foundations, such as the Gates Foundation or other large foundations. Using a science-in-society viewpoint, the idea of open science actually fits in very well with the idea of making money because one approach is very good for building up a base of knowledge quickly, but the other is very good for determining how can we actually use that knowledge to produce things that make people's lives better, that produce medical therapies, and that produce better products.<sup>4</sup> So in society as a whole, you really need to walk on both feet. You need people coming from the how-can-we-use-this [perspective], and one way that market societies connect people's needs to what people produce is through markets and profit incentives.

So I'm not against the profit incentive, and I'm not against intellectual property as a way in which you give people who undertake an investment and figure out how to actually produce a product, or have an invention which they patent and they get a certain amount of protection from competition, a way to recoup their investment. There is an incentive for them that they will make money on it if they get a good idea. The problem is that when you try to take both knowledge creation and exploitation and put them into one organization, you've got something that's a bit schizophrenic. We can go ahead really fast and solve a lot of problems, but we'll have to give [our knowledge] away in the process, so how will we make money? If we keep everything, then we're really in a cave and maybe we're going to run out of ideas, so we'll have to start looking around. But if everyone's doing that, then there won't be those ideas that we can pick up. A problem for society is to balance this conflict at

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4. See generally Paul A. David, *Europe's Universities and Innovation—Past, Present, and Future* (Stanford Institute for Economic Policy Research, Discussion Paper No. 06-10, 2006), [hereinafter David, *Europe's Universities*], available at <http://siepr.stanford.edu/papers/pdf/06-10.pdf>.

the societal level using specialized institutions, and a university is a specialized institution that used to be for doing academic, open science, which wasn't driven by the profit motive, and we have corporations with large labs, or small businesses and start-ups, which have another function.<sup>5</sup>

[When we] try to get the two things together in a university, we have two kinds of problems. One is that a university is not an organization that has been designed with a profit motive. Universities aren't armies. Armies are designed by geniuses to be run by idiots. That's an army phrase. But with universities it's the other way around: designed by idiots to be run by geniuses. When businesspeople interact with universities they very quickly say that it is a very difficult organization to work with. You can't tell the professors to do anything. To which a wise university president will say, "If I could, we wouldn't be a great university." A university is supposed to be a place where people can pursue their knowledge, work close[ly] with and control the agenda of their research, because nobody else is close enough to it to make the decisions of what they should do next. You might want to tell the professors what to do, but you cannot. You've got an organization with a problem if profit is a goal.

The next problem is with the teacher and the student. A teacher's obligation is, in some sense, to be the agent of the student. The student doesn't know exactly what he or she needs to know. It's the teacher's duty to teach what will be useful to the student and to have the student's interest in mind. Well, in order to do that, you have to find a contract, which encourages teachers to share everything that they know with the student. It's like going to a doctor. You want the doctor to find out what's wrong with you. You can't actually tell him what's wrong; you tell him your symptoms. And the doctor has to find the best treatment for you, but you don't know. You might try to do research, but you'd only be asking some other expert. So you have a problem of the relationship between two people who have different kinds of knowledge: "I know what kind of therapy I can tolerate, but I don't know whether it's the best therapy, somebody else has got to tell me which is the most effective one."

So we can go back and forth, but we have two kinds of knowledge. This exists between students and teachers. [A teacher may think], "If I tell this person what I just learned in my lab, is he going to go and rush out and tell my other colleague? Will that person rush out and go to the patent office? Maybe I don't want to do that." There is the whole problem about whether people share what they're learning and whether they ask each other questions for help. If I go and ask you a question, you're going to learn what I'm interested in. It can be very valuable to know where a business' interests lie. If you have a very specialized question, you can indirectly figure out what the business is doing. So some people stop asking questions. They only ask questions of

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5. See generally Paul A. David et al., *University-Industry Research Collaborations: Managing Missions in Conflict* (Mar. 1994) (unpublished conference paper, on file with Stanford Institute for Economic Policy Research) [hereinafter David, *Research Collaborations*].

people who are within a very tight circle. So the whole idea of the cooperative sharing of knowledge begins to be undermined.

We have enough recent examples of this in areas where the frontier of science is close enough to the opportunities to start new businesses in universities, where people run into this conflict on campuses or departments. It's usually in the life sciences. They have discussed the breakdown of conversation and communication within a given department. Students are told not to talk to another professor about the work that they're doing. In some parts, even in my university in Oxford, there are closed laboratories. That is, people have a laboratory, or are working on a project, and it's not open for other people to come in. The graduate students who are writing dissertations can't discuss their work, are told not to discuss their work with other people in the same faculty. This is kind of a slow unraveling of the idea of an open science community as a collective pursuit of knowledge . . . .

A good metaphor for this is that science is an endless Tour de France. In the Tour de France, you see all of the bicyclists: they're in a pack, they're moving together, they're not jostling each other, they're going along. At some point in each day, however, you see that there is a team actually, it's a small group of people, and this group kind of pushes forward, and then they sprint. The French call it the *stage*. At the end of [each] day there is a leader. So, it's a lot of little races, but in general, the Tour is going on more or less together. Science is a little bit like that. There is a tension between individuals wanting to get recognition for getting the answer first, but up to the point of the very last stage, they want to go along with everybody else until they can sort of say, "I could sprint here." That makes it a really complicated, interesting thing. But if you started with people really competing from the outset, then some of the team members would think about crashing now and holding everybody up behind them. "If we're in this to win, then why don't we do this?" So I think that's what is worrisome to people.

I think there is one other concern, which is not so much about the inner workings, but it is whether universities are really going to function as independent sources of knowledge. Science is so central in the life of our society; there are so many . . . issues about control and regulation that are referred to scientists, even very, very controversial issues, like questions of abortion: when does life begin? Many of these issues are in the courts. So it's an important thing to have independence of people who don't have a direct interest, who don't have a commercial interest, and who don't have some precommitted political interest. The university in modern societies is looked to as being the place where that goes on. As soon as universities have a corporate interest in business, then they're in business with other businesses. It's one thing for the individuals to have interests; I believe [individuals ought] to make money in a profession. But it is when the university has a business interest as a corporation that people begin to say, "Well hey, maybe the public shouldn't be supporting this." If you take that step, then you say, "Well, we're not going to support this profit making." Then you've done away with the idea; then you've just created another business with an organization, which isn't really

made to run a business. That's a problem.

MR. INGE: We have a caller here and I'd like to bring him into the conversation . . . .

CALLER: Thank you. It's been a pleasure listening to you, and I'd like to comment that on this very day from the BBC, an economist from the World Bank, Professor Stern, addressed the matter of global health, and the wealth that we derive from this planet. [He stated that] it must be a priority to deal with the issues of global warming and pollution and other factors that certainly are having ramifications on the physical aspect of the planet. He was followed with a comment by Prime Minister Blair, [who said that] it was not a matter of whether we should, but that we must do something, and to the extent that we can have priorities to address this matter, other issues will be of lesser importance for us.<sup>6</sup> We could be gaining wealth here and there, . . . but there is no turning back if we don't make changes now. I think that some imperatives and priorities must be impressed upon the university in the research and science areas so that we can more enrich our endeavor to sustain the planet for our behalf and [for] future generations. . . .

On matters of sharing, . . . Dr. DeBakey was on the forefront of heart circulation and transplants, and he struggled to raise funds to share knowledge that we had with Russia.<sup>7</sup> We had gone this far in our research and the Russians had gone that far with their research, and they all decided to share the knowledge and benefits that had accrued to this area of medical research, endeavor and application. And Dr. DeBakey succeeded in getting funds to simply learn the terminology so that everyone could speak on the same level. Other examples of sharing knowledge in the future certainly will be imperative. Thank you again for your comments.

PROFESSOR DAVID: I thank the caller because his comments have touched on at least three things, which caught my interest and were related to things I'd been saying. First, sharing knowledge is not a costless activity. If there is a gain through exchange of knowledge, then some provisions have to be made to . . . encourage people to do this, because . . . [it] competes with doing more research. It also means that you've got to translate what you're doing into a standard language. And all of those activities are kind of like an infrastructure or a supporting set of activities to create a platform on which people can communicate.<sup>8</sup> This is a costly activity. It is not an activity that businesses are going to support, so that's where the public [plays a] role. Universities are part of that infrastructure. And for them to play that role, they

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6. See *Climate Change Fight 'Can't Wait'*, BBC NEWS, Oct. 31, 2006, <http://news.bbc.co.uk/2/hi/business/6096084.stm> (including a summary of Nicholas Stern's 700 page study suggesting that global warming could shrink the global economy by twenty percent, followed by comments made by British officials).

7. Dr. Michael E. DeBakey's pioneering work includes, among other things, developing Dacron arteries and arterial bypass operations; in 1997 he traveled to Russia to consult on the surgery of then-Russian President Boris Yeltsin. See Dr. Michael E. DeBakey, 2001 Mendel Medal Recipient, <http://astro4.ast.vill.edu/mendel/debakey.htm> (last visited Feb. 19, 2007).

8. See David, *Europe's Universities*, *supra* note 4, at 1-2, 12-13, 16-18; David, *Research Collaborations*, *supra* note 5, at 3-8.

have to be open to these kinds of communications. It was interesting that in the Cold War, it was the contacts between scientists that kept open many channels of communication between the Soviet Union and the Soviet Bloc countries and the West.<sup>9</sup> The visiting back and forth also served in some times as a back channel for diplomatic and other contacts. So science, because it's global in many areas, has this larger function in society that permits contacts with other societies where there are many instances of political, military and other business rivalries. This is due to certain common goals shared by scientists. The ethos of science as a global, human activity is an important feature, and it's very closely coupled with the open science.<sup>10</sup> I think that's one point.

There were two other points, which I'd like to press briefly. The caller said it was really important to try and translate our knowledge about the phenomena of global warming into action. And taking action can be in terms of what we can do to slow down the rate of greenhouse gas emissions and sustainable energy programs. A lot of that is inventive-focused activity, and for that, research of an applied kind is important. There are sometimes areas for good cooperation between university-based scientists and business firms that see in the green energy world, and in the renewable-resource-saving activities, opportunities for future profit that need a good base in knowledge. So there's a very important cooperative area where the university-based scientists and business-based scientists can work in partnership arrangements.

Finally, when you say, "Okay, we got this knowledge that says there is a problem with global warming," then you also see how important it is to have a large community that was international, that finally could accumulate enough evidence to change the conversation, which for a long time was: "Maybe there isn't anything called global warming, maybe this is just a local cycle. It may last for a while, but then it will go away." Business firms that depend upon burning fossil fuels directly or indirectly for a long time said there wasn't a problem. If universities and other public research organizations took an interest in oil exploration, they might begin to say: "Maybe we shouldn't also be letting people work, or encouraging people to work, on the question of why we've got to stop burning fossil fuel." If universities are going to be wholehearted about this, why should one hand be undoing what the other hand is doing? This is again where an independent quest for knowledge needs to be supported by society. So the caller sort of hit three really important points in that call.

MR. INGE: . . . . We do have someone else here that I'd like to include . . . .

CALLER: Thank you. It's a pleasure to speak with you. You've just

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9. See generally, Ronald E. Doel, *Evaluating Soviet Lunar Science in Cold War America*, 7 OSIRIS 238, 238-64 (1992) (broadly discussing the role of scientists throughout the Cold War in influencing international communication).

10. See David, *Europe's Universities*, *supra* note 4, at 6; David, *Research Collaborations*, *supra* note 5, at 6-15.

touched on my question, which is an alternative view of knowledge production and transferring, [in] which government, universities and industry are cooperating. I can think of translational research in medicine as one example. However, historically, we seem to view the business side as perhaps in conflict with the notion that good science is progressing. I wonder if you could discuss the barriers between the sectors and comment on the notion of a historical view of business that's sort of anti-good science. Thank you.

PROFESSOR DAVID: I think there is excellent science done in business today. I do not think that's the issue. I think the caller is right in saying that there was a culture of purity in science that sort of took the view that scientists should not be interested in the commercial aspect of science if they were in the university and were being publicly supported. That is different from saying that businesses cannot do "good" science. That's just like the university appropriating science as being a thing that it defines. Business firms have made very important contributions and advances in science.<sup>11</sup> The issue is often that when people working on frontier areas of science in the university are also looking over their shoulder or looking over the horizon at a business proposition, they will look for the things that do not involve really complicated business organizations to set up. For example, take areas like genomic research and genetic testing. When you isolate a particular disease and trace it to its genetic origins, you usually have—almost as a byproduct—invented a diagnostic test for the presence of the gene, and you can find out about the gene as well. You could commercialize it. You could make a diagnostic kit. You could sell diagnostic tests. We have a lot of examples of university scientists who have started businesses spinning off diagnostic tests from this. The tests are very expensive. They turn out actually to be available only to small portions of populations who can afford them. They have changed the business of doing testing, and so you get a lot of early insertion into the process of a cost of actually transferring this to end-users. You can transfer it to a business, but then the business makes money. The cost of that means that the transfer to the end user is impeded, and I think that's where the problems arise.<sup>12</sup>

MR. INGE: There's another question I want to ask, and unfortunately I don't have the opportunity to ask thoroughly, but it's an economic question I at least want to touch on, and that is the sense in which perhaps encouraging universities to develop and commercialize their research is a false promise. It does actually cost money to do the development. If you set up an office of technology licensing or whatever it is you call it, it does cost money. I think you've made the argument that in fact the number of universities that can make significant money from developing ideas is relatively small, certainly if you think that that's going to mean more money for the university, in most cases, that's not going to happen.

PROFESSOR DAVID: You're absolutely right. You've stated the point

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11. See David, Research Collaborations, *supra* note 5, at 2.

12. *Id.* at 9.

well. I think you have to think about—as people who are really in the business of patenting and making money from invention understand—patenting [as] a lottery; [a] very, very small number of patents really turn out to be big hits. So, first of all, the question is how much money are you willing to spend on the lottery? . . . [O]f the 200 universities in the United States, which get almost ninety-eight percent or more of federal funding, . . . there are 10 that have made significant amounts of money. And even that is a very small proportion—the total amount of licensing fees in the United States is maybe about \$1.5 billion. This is a tiny fraction of the running costs of universities, or even the part that universities contribute to the cost of doing research, in terms of state funding for buildings, for equipment, private gifts and donations. Universities can't run on that. It's a small amount of money for the winners, and there are a handful of elite universities who are up in there. My university of Stanford is one, MIT is another, University of California is another, Columbia is another, and the University of Florida, which got the patent for Gatorade, [which] is a big hit. There are about 10 of them. About forty-eight percent of the universities never got any money at all from licensing any patent, but they all file patents. And filing a patent today, depending upon what kind of patent it is, costs somewhere between maybe eighteen and twenty-eight thousand dollars. Something in that range. It's not cheap. And so there is a real question about whether this is a business. It's true that universities could get better if they worked at it. There are a lot of smart people at universities. The question is, do they need to? Is this something that universities should be doing? My proposal, shortly, is to separate this activity: create separate organizations that universities can transfer their patents to. Let those organizations decide which potential patents should be exploited and developed, and figure out how to license them, and separate universities from the conflicts of mission that are involved with trying to be in the business of commercializing its own research.

MR. INGE: And that can't be as just a branch of the university? It has to be completely separate, so the two processes—the idea or development process and the commercial process—can't influence each other.

PROFESSOR DAVID: State universities have enough trouble figuring out how to run basketball and football teams and to figure out how to deal with the commercial aspects of that. Giving them yet another business to run is probably [a bad idea]. If you think about the problem that sports occasions in universities [pose], you get a small idea of how complicated it would be to really run a commercial business that licenses patents and copyrights.

MR. INGE: We'll have to leave it at that . . . Thanks very much.

PROFESSOR DAVID: You're welcome and it's been a pleasure being on your show.